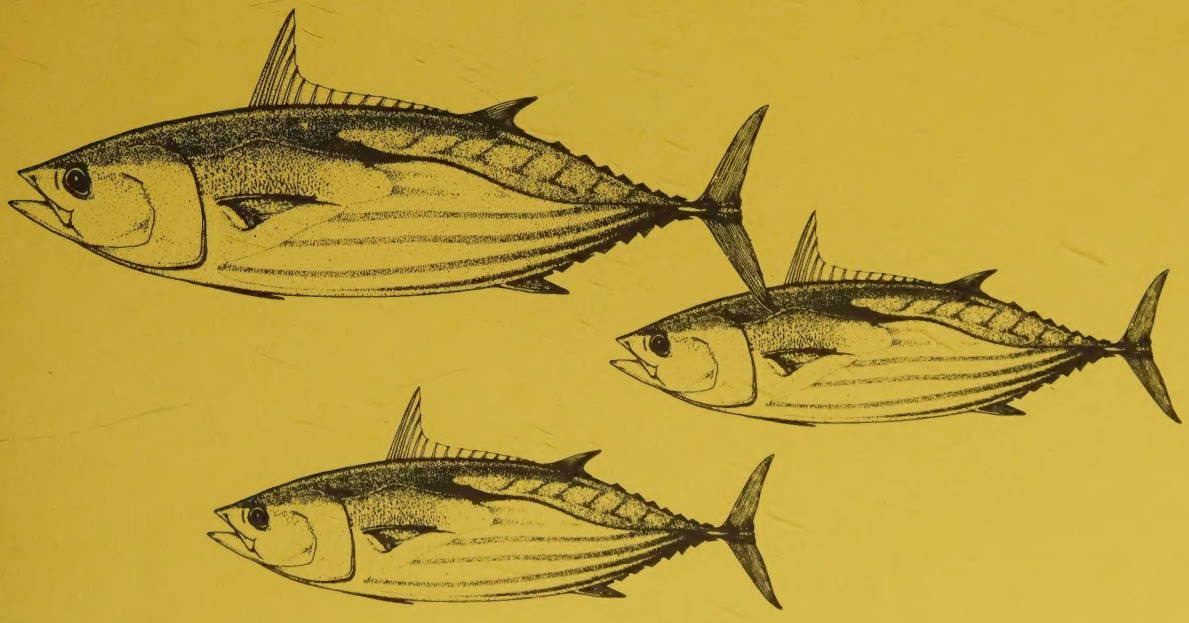
MAY 1976
No. 5

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / NATIONAL MARINE FISHERIES SERVICE

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
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FISHING INFORMATION

MAY 1976, No. 5

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N. Abramson, Director, Tiburon Laboratory

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. This is a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this publication approved by the Office of Management and Budget, August 20, 1973; this approval expires June 1976.

Submitted for publication - June 23, 1976

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, 10, 11, and 15-day Supplement)

TECHNICAL EDITOR:
R. Allen
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R. Allen, H. Orr

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National Environmental Satellite Service, Washington, D.C.
National Marine Fisheries Service, La Jolla, California; Honolulu, Hawaii
National Ocean Survey, Pacific Marine Center, Seattle, Washington
National Weather Service, San Diego, California and Washington, D.C.
Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L.F. Giovando from observations by
L. Sabourin at Langara Island Light; G. Anderson at Cape St. James Light;
L. Collins at Kains Island Lightstation; I.G. McNeil at Amphitrite Point Light
Scripps Institution of Oceanography, La Jolla, California
Fishing Vessels, *Cabrillo, Captain Joe Medina, Caribe, Carol S., Carol Virginia, Cheryl Marie, Christina C., Concho, Eastern Pacific, Frances Ann, Jo Linda, Karen Mary, Kathleen, Marco Polo, Maria C.J., Maria Elena, Marietta, Marla Marie, Missouri, Pacific Queen, Pan Pacific, Raefello, Rosa Olivia, San Juan* (WX8016), *San Juan* (WI7714), *Santa Rosa, Saratoga, Trinidad, Venturous, Willa G.*

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Californian,* and *Hawaiian Queen* of Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, using computer facilities of the Fleet Numerical Weather Center. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Albacore Tuna Forecast for 1976

R. Michael Laurs and Staff
Albacore Fisheries Program
National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)

This is the 16th annual advisory to be issued by the National Marine Fisheries Service for the albacore fishery off the North American coast.

It appears that catches of albacore off central and southern California should improve this season over what they have been for the past several years. It is estimated that approximately 50% of the total catch will be taken in waters south of San Francisco and 50% in waters to the north. During the 1975 albacore season, about 70% of the catch was made from waters off the Pacific northwest and 30% from waters south of San Francisco.

The results of 1) preseason scouting and 2) the apparent long-lasting and more westerly position than usual for this time of year of the Japanese live-bait fishery in the western Pacific indicate that at least a portion of the migration of albacore to the North American west coast will be late in arriving this season. This may be the case especially for fish entering waters off the Pacific northwest. Good early-season fishing is expected, however, off southern California southward to about Guadalupe Island. The appearance of concentrations of fish off northern California, Oregon, and Washington is not expected until after mid-July to early August. Overall, it is expected that fishing will be good off central California, but that the fishery there may also be somewhat later than usual in starting. Fishing in the offshore waters between 135° to 145°W is expected to be fairly good about mid-June south of approximately 35°N and somewhat later north of 35°N. Because of weak oceanic frontal conditions, fish may move through the offshore waters south of 35°N rather quickly and fishing may be somewhat scattered. North of 35°N the frontal conditions appear to be stronger and fish may be more concentrated.

The outlook for sportfishing off southern California is good with an expected early start.

RECENT TRENDS IN OCEANIC AND ATMOSPHERIC CONDITIONS

During the first half of June 1976, seasonal warming occurred at a near-normal rate over most of the eastern North Pacific. However, sea surface temperatures were still 1 to 2°F (0.6 to 1.1°C) below normal within a 300-mile band along the coast from Canada to Point Conception. Above-normal temperature conditions existed offshore southern and Baja California, and the 64 to 66°F waters should bring albacore within range of southern California sportfishermen in mid-June.

As reported in the April 1976 issue of Fishing Information, vertical temperature sections based on expendable bathythermograph (XBT) drops made from merchant ships[1/] travelling between Hawaii and U.S. west coast ports indicate that the transition zone between the waters of the California Current and the eastern North Pacific central waters is and will continue to be diffuse and the temperature and salinity fronts will be weak during the summer of 1976. These conditions should aid the early-season arrival of albacore off southern California and northern Baja California.

According to information supplied by the Long Range Prediction Group of the National Weather Service, sea level pressures are expected to be near normal over the eastern North Pacific from mid-June through mid-July. As usual the sub-tropical high over the eastern North Pacific will expand and move northeastward, forming a high pressure ridge over the Pacific Northwest. This ridge, coupled with a thermal low over the interior western U.S. will cause tight pressure gradients and strong north-to-northwesterly winds off the coast from central Oregon to central California. These winds, in turn, will cause the usual intensification of upwelling and thermal gradients that are favorable to the concentration of albacore schools.

[1/] Cooperative NMFS-NORPAX Ships of Opportunity Program

HISTORICAL TRENDS IN ALBACORE CATCHES

Seasonal landings of albacore tuna for the Pacific West Coast (U.S. and Canada) for the period 1938-1975 are shown in Figure 1. This chart does not take into account changes in fishing effort or efficiency. West Coast landings for the 1975 season, based on preliminary information, were approximately 49.0 million pounds, which is almost the same as the long-term average.

The percentage of the total West Coast catch taken north of San Francisco for the period 1938-1975 is shown in Figure 2. The percentage north-south distribution of catch reflects the large shifts in the location of the centers of the albacore fishery which have taken place over the past 37 years. During 1975, about 70% of the catch was taken north of San Francisco and 30% south.

Albacore landings by states for recent years are as follows:

Albacore Landings by State for 1970-1975

State	1975*	1974*	1973	1972	1971	1970
California	15.4	8.3	8.6	21.0	36.1	29.9
Oregon	17.1	25.2	16.3	23.1	8.4	21.8
Washington	16.3	18.0	13.1	16.2	5.3	4.4
British Columbia	0.2	2.6	2.8	7.6	3.7	1.6
Total	49.0	54.1	40.8	67.9	53.5	57.7

*preliminary

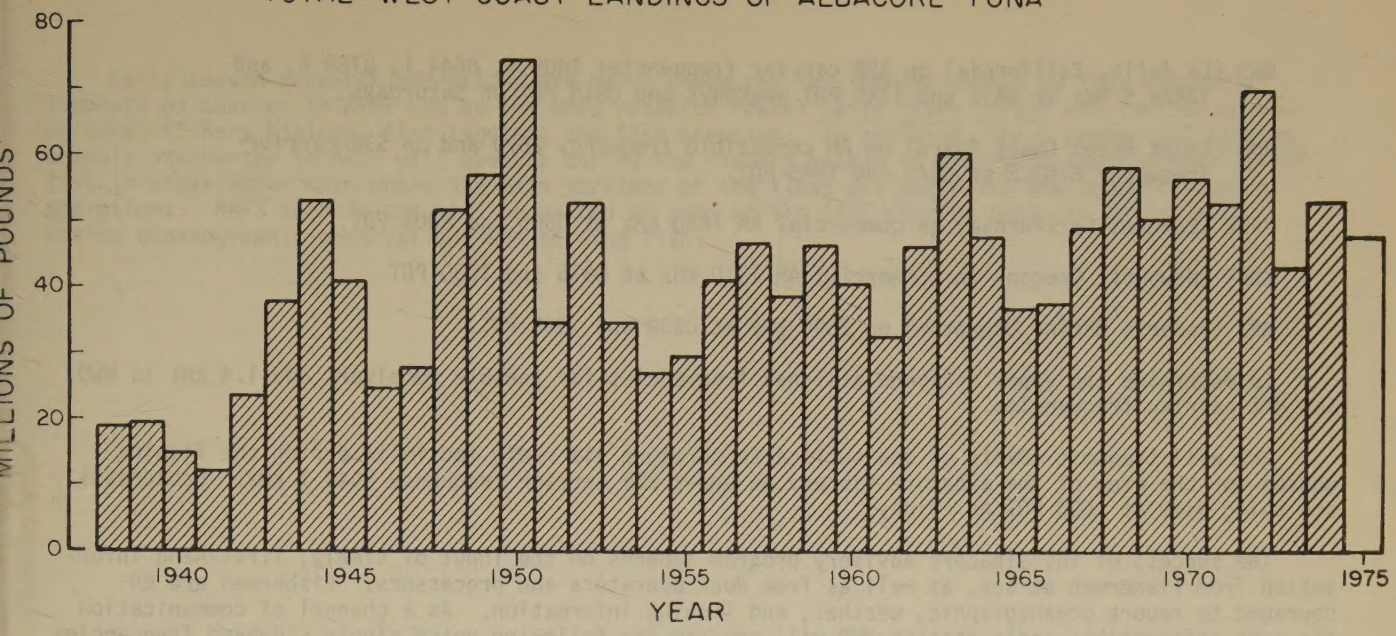
NMFS ADVISORY OPERATIONS FOR THE 1976 SEASON

The NMFS, La Jolla Laboratory, will issue albacore advisory information throughout the 1976 season in addition to the above forecast. The advisory information will include sea surface temperature charts, narrative albacore fish bulletins, and daily broadcasts of albacore fishing information over marine radio bands.

The albacore fish bulletins will be issued twice each month during the season in conjunction with 15-day sea surface temperature charts which cover the area roughly between central Baja California and Vancouver Island out to 135°W. The bulletins will include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate. The NMFS fishery advisory materials are mailed to fishermen upon request and are bulk-mailed to fish buyers and processors for further dissemination to fishermen.

Daily broadcasts of albacore fishing information will also be prepared by the La Jolla Laboratory and will be transmitted over marine radio bands again this year. The broadcasts will be made twice daily on weekdays and once on Saturday mornings from July 12 through October 31, or until the albacore season ends. The broadcasts will include the latest albacore fishing information obtained from research vessels, cooperating fishing vessels, unloading station operators and other sources. Highlights will include location of active centers of fishing, typical fishing scores, size of fish, sea surface temperature and subsurface temperature information when available, and other information as appropriate. Sport boat albacore fishing activity will also be included. A weather and sea state summary prepared by the National Weather Service will also be given including large-scale weather features, regional wind, weather, and sea state conditions between 20-250 miles offshore, and storm development. NMFS will also transmit weekly charts of sea surface temperature via radio facsimile over radio station WWD.

Nearly coast-wide reception of the albacore fishery advisory broadcasts will be available again this year. The broadcasts will be transmitted by 1) radio station WWD, which is licensed to the NMFS and located on the Scripps Institution of Oceanography (SIO) campus at La Jolla, California, 2) Coast Guard radio station NMC at Point Reyes, 3) radio station KRED in Eureka, California, 4) radio station KNPT in Newport, Oregon, and 5) the Astoria Marine Operator, KFX. The schedule and frequencies for the broadcasts are as follows:



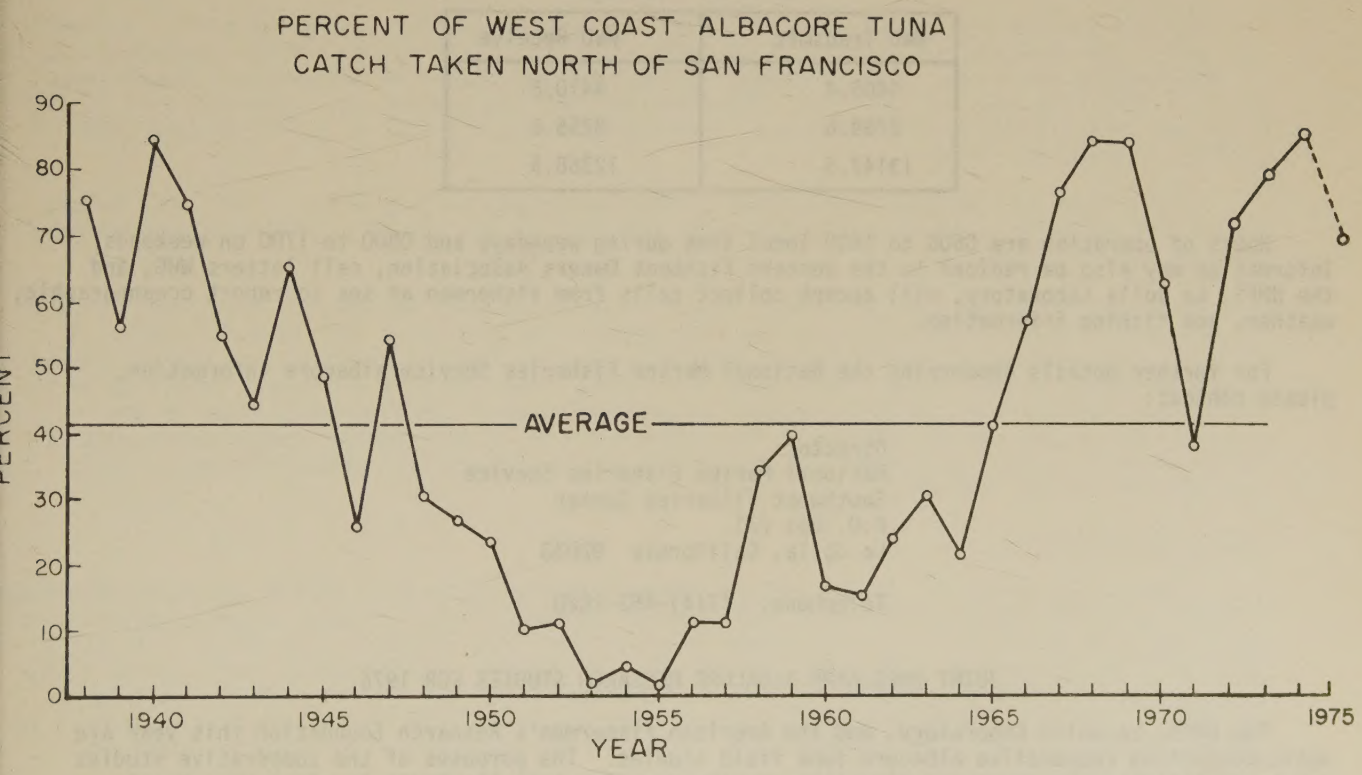


PLATE 1.— Top graph: Total west coast landings of albacore tuna in millions of pounds, 1938–1975.

PLATE 2.— Bottom graph: Percent of west coast albacore tuna catch taken north of San Francisco, 1938–1975.

WWD (La Jolla, California) on SSB carrier frequencies 4409.4, 8644.1, 8789.6, and 12424.5 kHz at 0615 and 1745 PDT weekdays and 0815 PDT on Saturdays.

NMC (Point Reyes Coast Guard) on AM compatible frequency 2670 and on SSB carrier frequency 8760.8 at 0645 and 1945 PDT.

KRED (Eureka, California) on commercial AM 1480 kHz at 0605 and 2005 PDT.

KNPT (Newport, Oregon) on commercial AM 1310 kHz at 0615 and 1830 PDT.

KFX (Astoria Marine Operator) on 2598 kHz at 0630 and 1945 PDT.

To determine the upper sideband assigned frequencies for tunable receivers add 1.4 kHz to WWD and NMC carrier frequencies.

WWD will transmit charts of sea surface temperature via radio facsimile during the fishing season for the area of the albacore fishery on upper SSB carrier frequency 8644.1 kHz. Broadcasts are being made at 1000 PDT on Fridays.

The success of the albacore advisory program depends on the input of timely, first-hand information from fishermen at sea, as well as from dock operators and processors. Fishermen are encouraged to report oceanographic, weather, and fishing information. As a channel of communication for such information, radio station WWD will operate the following voice single sideband frequencies and schedules.

Carrier Frequencies

WWD Transmit	WWD Receive
4409.4	4410.8
8789.6	8255.6
13147.5	12368.5

Hours of operation are 0600 to 1800 local time during weekdays and 0800 to 1700 on weekends. Information may also be radioed to the Western Fishboat Owners Association, call letters WHG, and the NMFS, La Jolla Laboratory, will accept collect calls from fishermen at sea to report oceanographic, weather, and fishing information.

For further details concerning the National Marine Fisheries Service albacore information, please contact:

Director
National Marine Fisheries Service
Southwest Fisheries Center
P.O. Box 271
La Jolla, California 92038

Telephone: (714)-453-2820

JOINT NMFS-AFRF ALBACORE RESEARCH STUDIES FOR 1976

The NMFS, La Jolla Laboratory, and the American Fishermen's Research Foundation this year are again conducting cooperative albacore tuna field studies. The purposes of the cooperative studies are to investigate the shoreward migration of albacore tuna into the North American West Coast fishery and the associated marine environmental factors that influence this migration, and to study the early-season and within-season distribution of albacore in the offshore and nearshore regions. These studies are designed to improve our knowledge of factors affecting the onset and subsequent development of the fishery, to examine the possibilities for fishermen to extend the fishery farther offshore, to start the fishery earlier than is usual, to better "stay on fish" during the season, and to collect biological information on the albacore for research studies concerning fish-ocean relationships and population dynamics.

Early-season research operations are being conducted in offshore waters by four commercial jigboats on charter to AFRF and by the NMFS research vessel David Starr Jordan and include oceanography, fishery biology, fish tagging, and fish scouting. In addition, three commercial fishing vessels on charter to AFRF will operate during the fishing season to determine the availability of fish in areas other than where the main portions of the fleet are operating and conduct tagging operations. NMFS technicians will be placed on some of the AFRF charter boats to assist in making oceanographic observations and tagging fish.

Sea Surface Temperature and Environmental Conditions

N. CLARK AND F. MILLER

Eastern North Pacific

Sea surface temperature warmed at a below-normal rate over the entire eastern North Pacific during May 1976. The area of greatest warming occurred off the coasts of Washington and Oregon out to 400 miles offshore where temperatures increased 2 to 3°F (1.1 to 1.7°C) between April and May.

The sea surface temperature anomaly pattern for May was similar to that of April. However, the band of above-normal temperature in the central North Pacific moved slightly southward west of 160°W during the month. A major change occurred in the pattern of below-normal temperatures north of 40°N with 2 to 3°F (1.1 to 1.7°C) anomalies covering most of the ocean area west of 140° W and the area off the Pacific Northwest changing from 2 to 3°F (1.1 to 1.7°C) to less than 1°F (0.6°C) below-normal values.

Temperatures off northern and central California dropped to 2 to 3°F (1.1 to 1.7°C) below-normal values, while above-normal temperatures occurred off the southern California and northern Baja California coasts.

Sea level pressures were up to 4 millibars above normal over the eastern North Pacific south of 45°N during May, resulting in a strong high pressure cell centered near 35°N and 145°W. A ridge of high pressure also extended northeastward over the Pacific Northwest and western Canada. Sea level pressures were up to 7 millibars below normal over the Gulf of Alaska, resulting in a fairly deep surface low over this region. Stronger-than-normal northwesterly winds on the western side of the low contributed to the intensification of below-normal temperatures west of 140°W, while stronger-than-normal southerly winds on the eastern side allowed temperatures to warm off the Pacific Northwest.

Western North Pacific

The greatest change in the sea surface temperature anomaly pattern during May occurred between 20°N and 30°N and 160°E and 180 where temperatures that were either slightly above or below-normal increased to 2 to 3°F (1.1 to 1.7°C) above-normal values. The region of 2 to 4°F (1.1 to 2.2°C) below-normal temperatures that formed off Hokkaido and northern Honshu during April spread southward during May replacing 2 to 3°F (1.1 to 1.7°C) above-normal temperatures off the west coast of Honshu. No large changes occurred in the anomaly pattern of the central western North Pacific, and many small areas of 1 to 2°F (0.6 to 1.1°C) above and below-normal temperature anomalies existed through May.

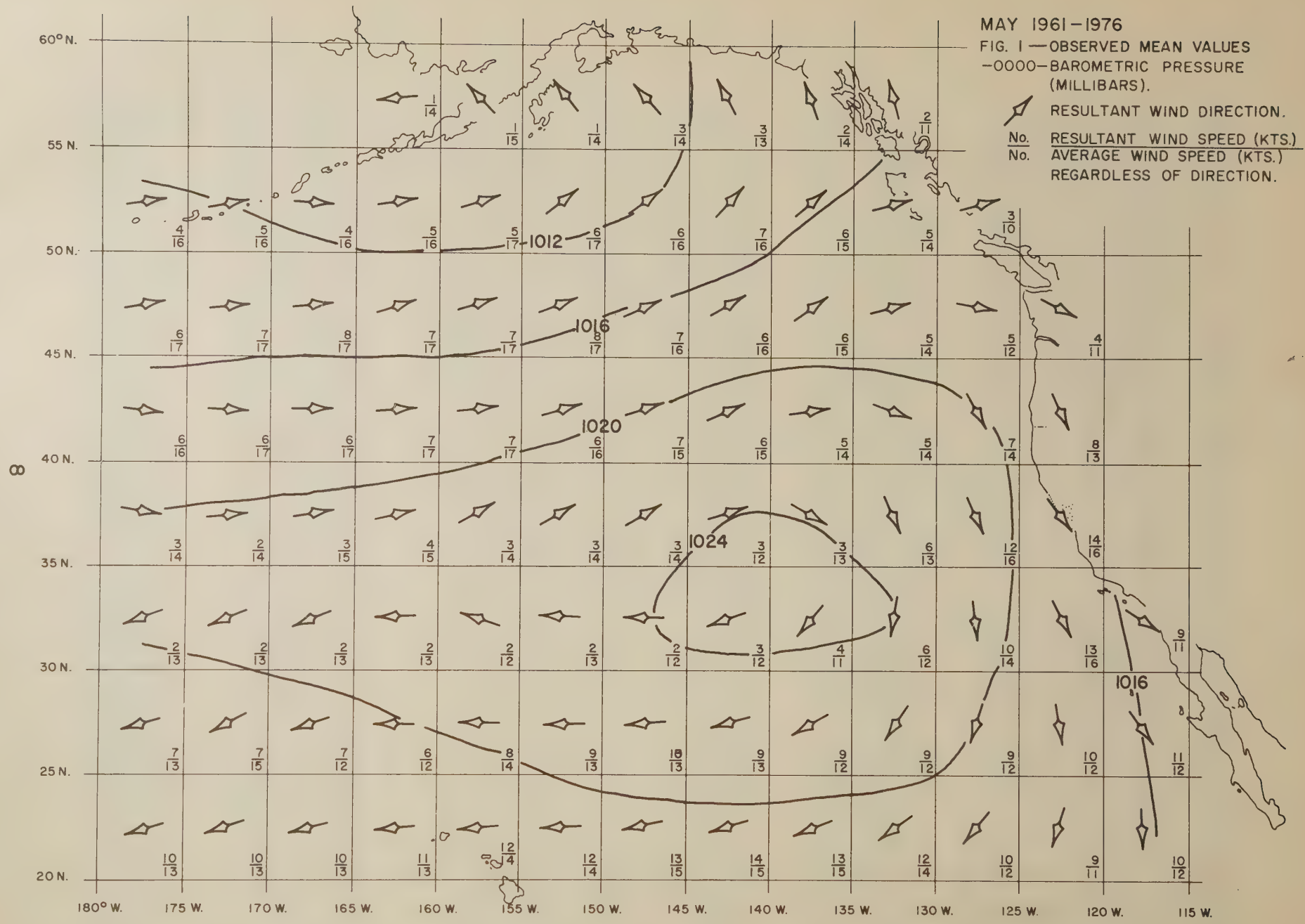
Eastern Tropical Pacific

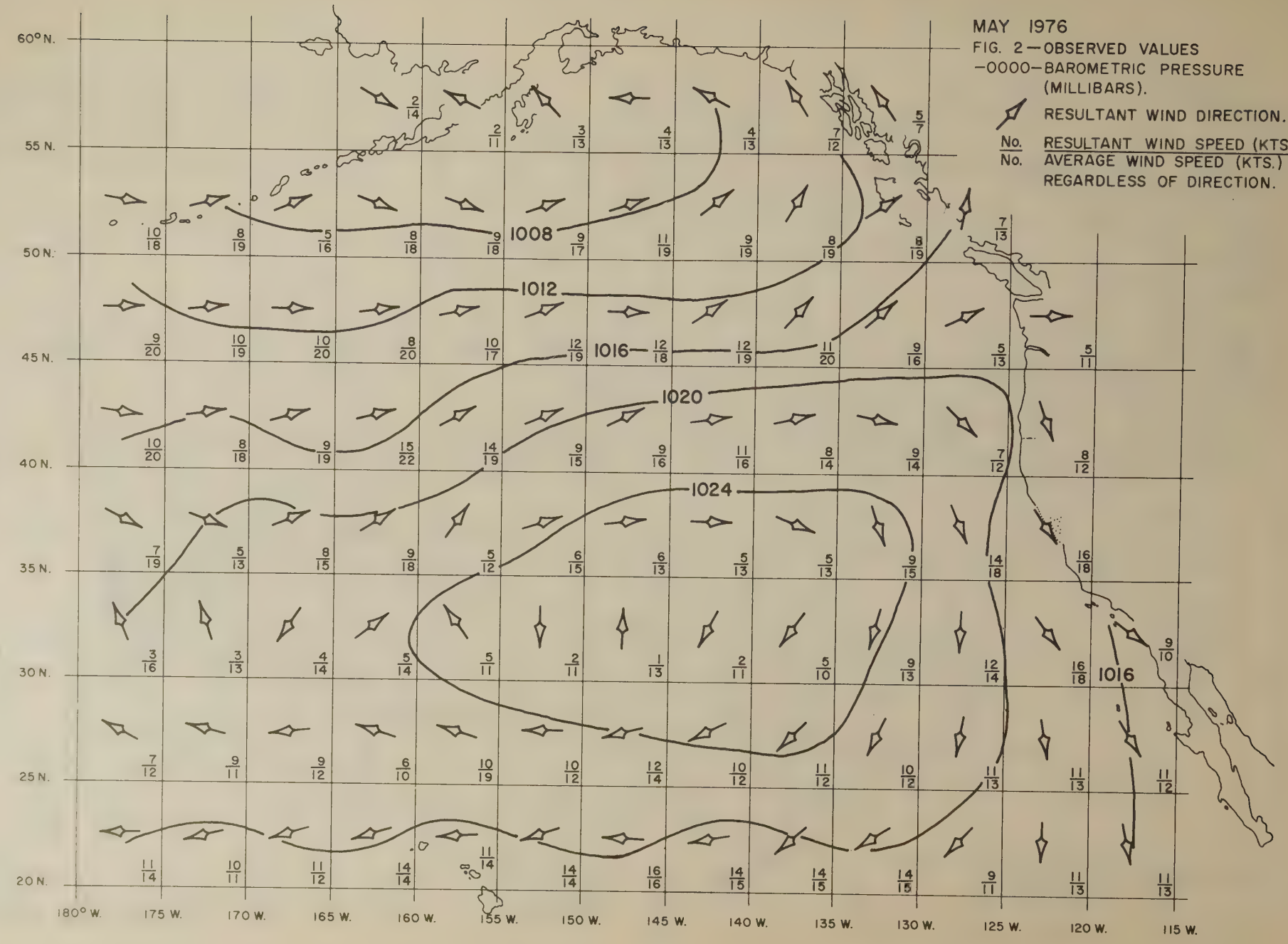
By May, sea surface temperature (SST) in the northern hemisphere normally begin to show significant increases in most areas. SST's usually increase more than 2 F (1.1°C) in the Gulfs of California and Panama and along the coast of Mexico from 25°N to 15°N. In the southern hemisphere seasonal cooling rates in the surface layers of the Peru Current increase from 2 to 4°F (1.1 to 2.2°C). Similar cooling rates normally occur along the equator from Ecuador to 110°W.

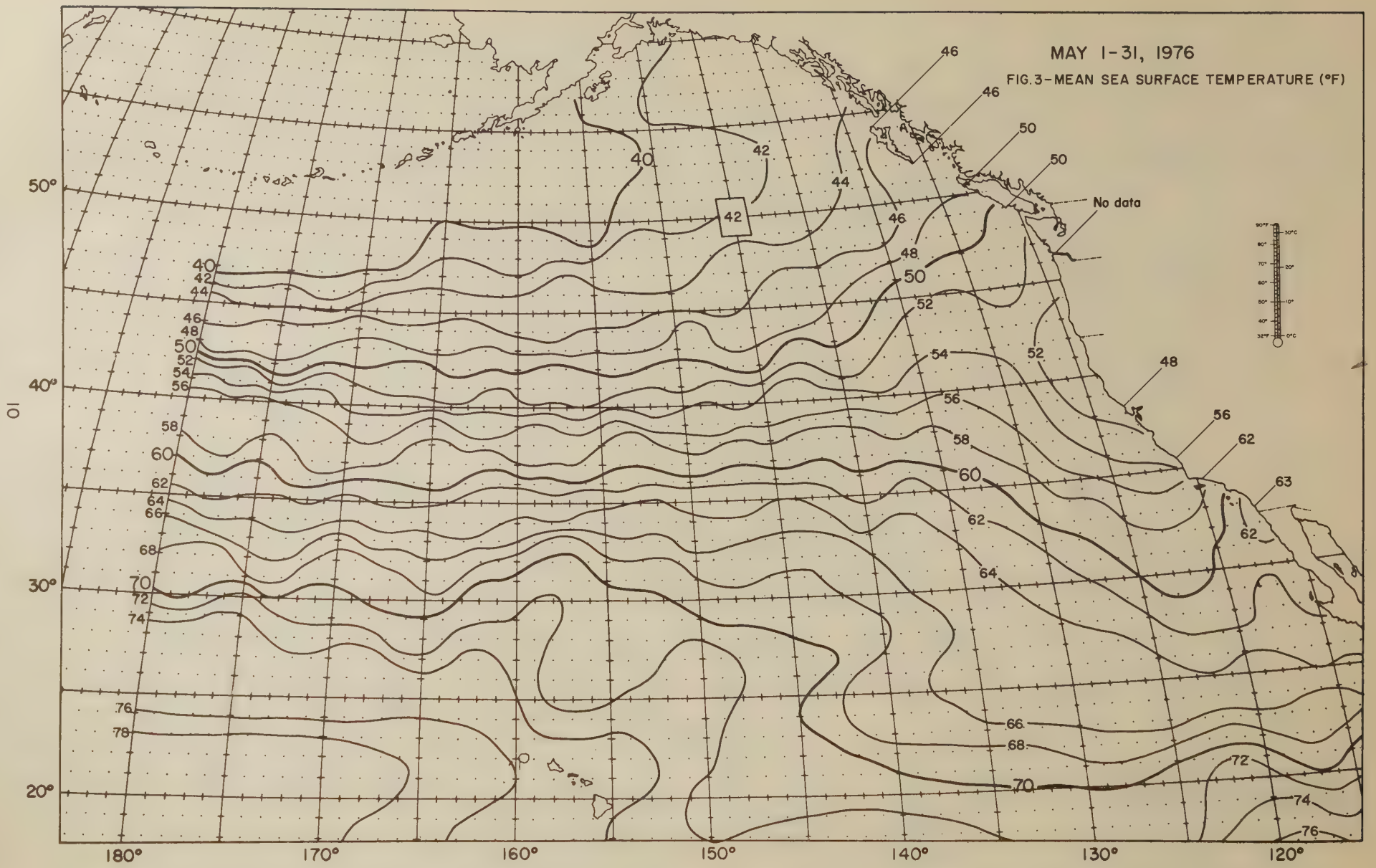
In these areas of rapid cooling, steady southeast trade winds increase vertical mixing resulting in cooler surface temperatures. In other parts of the southern hemisphere in the eastern tropical Pacific there is only a slight cooling rate.

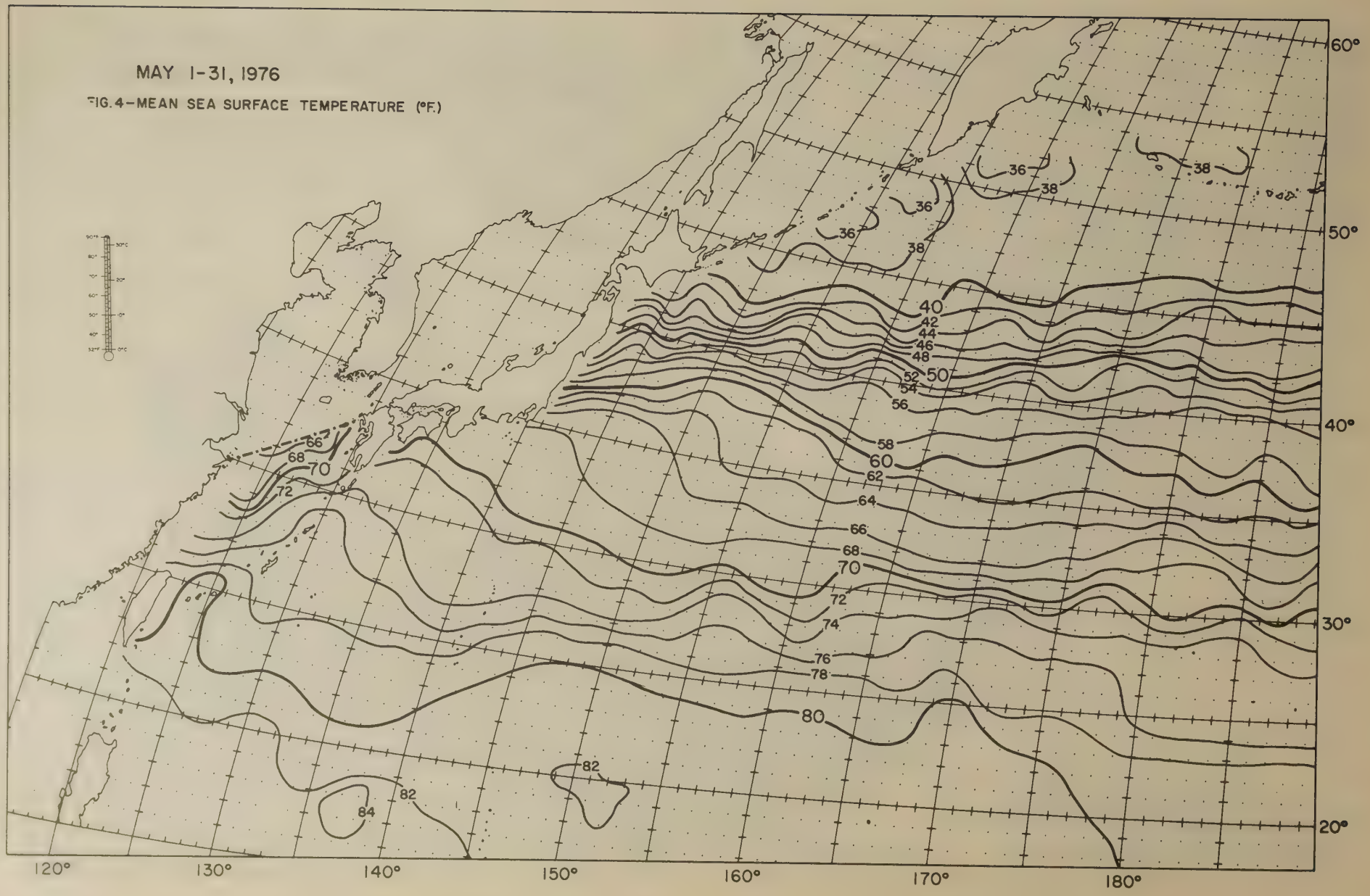
During May 1976 along the equator from 5°N to 10°S and east of 110°W extensive warming occurred (Figure 8). The positive SST anomalies (Figure 9) were greater than 4°F (2.2°C) in three areas along the equator where upwelling was weaker than normal. The patterns of warming in the equatorial region east of 110°W and off the coast of Peru and Ecuador were similar to those in April 1976. However, a change took place along the coast of Peru from 5°S to 10°S which indicated that the warm offshore water moved nearer to the coast than in any previous month since December 1972 when an El Niño (an unusual SST warming condition) reached its maximum intensity. This does not mean that an El Niño is about to occur, but conditions should be closely watched along the coast of Peru for possible continued coastal warming in June. The surface high pressure center, which normally is intense off the coast of Chile and Peru, was weakened in May by the passage of frequent storms. Along the coast south of 10°S (Figure 9) SST's remained slightly cooler than normal.

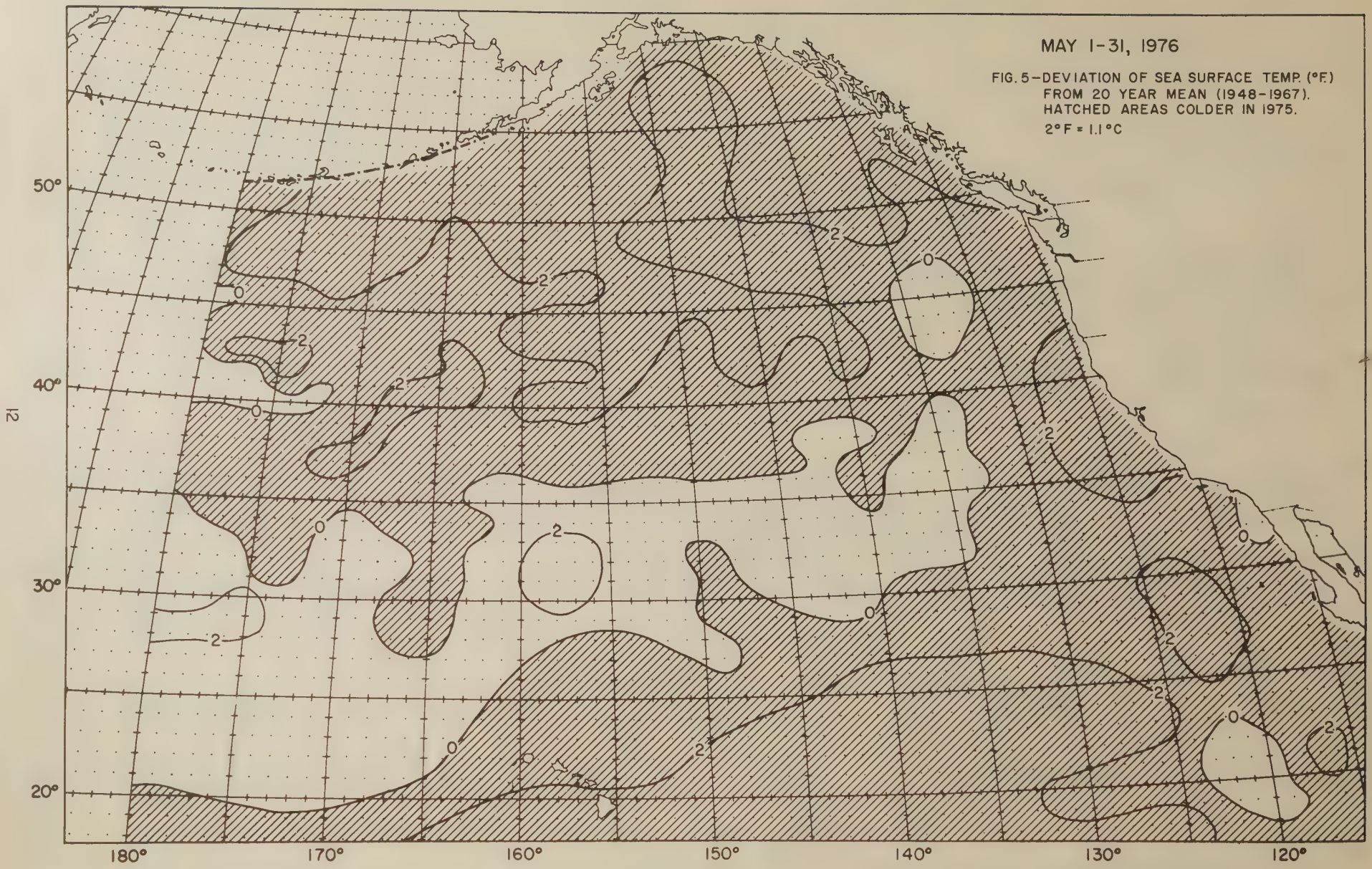
In the fishing grounds north of the equator SST's have warmed faster than normal. The area east of 110°W, which had large negative anomalies in March, have had a warming trend, and the negative anomalies in May (Figure 9) have been significantly reduced. Elsewhere in the eastern tropical Pacific north of the equator normal seasonal warming took place.

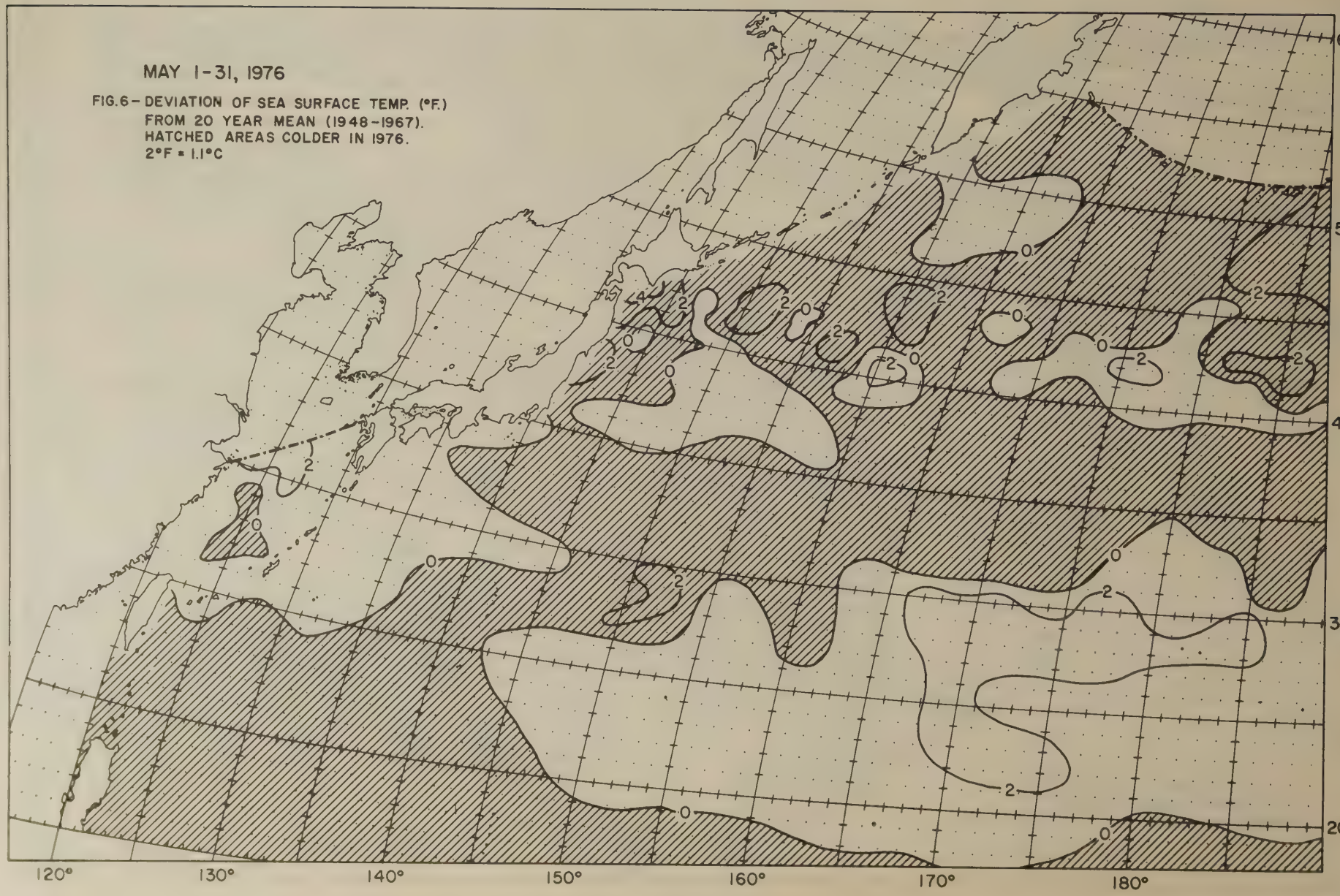

MAY 1961–1976
FIG. 1—OBSERVED MEAN VALUES
–0000–BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No./No. RESULTANT WIND SPEED (KTS.) / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

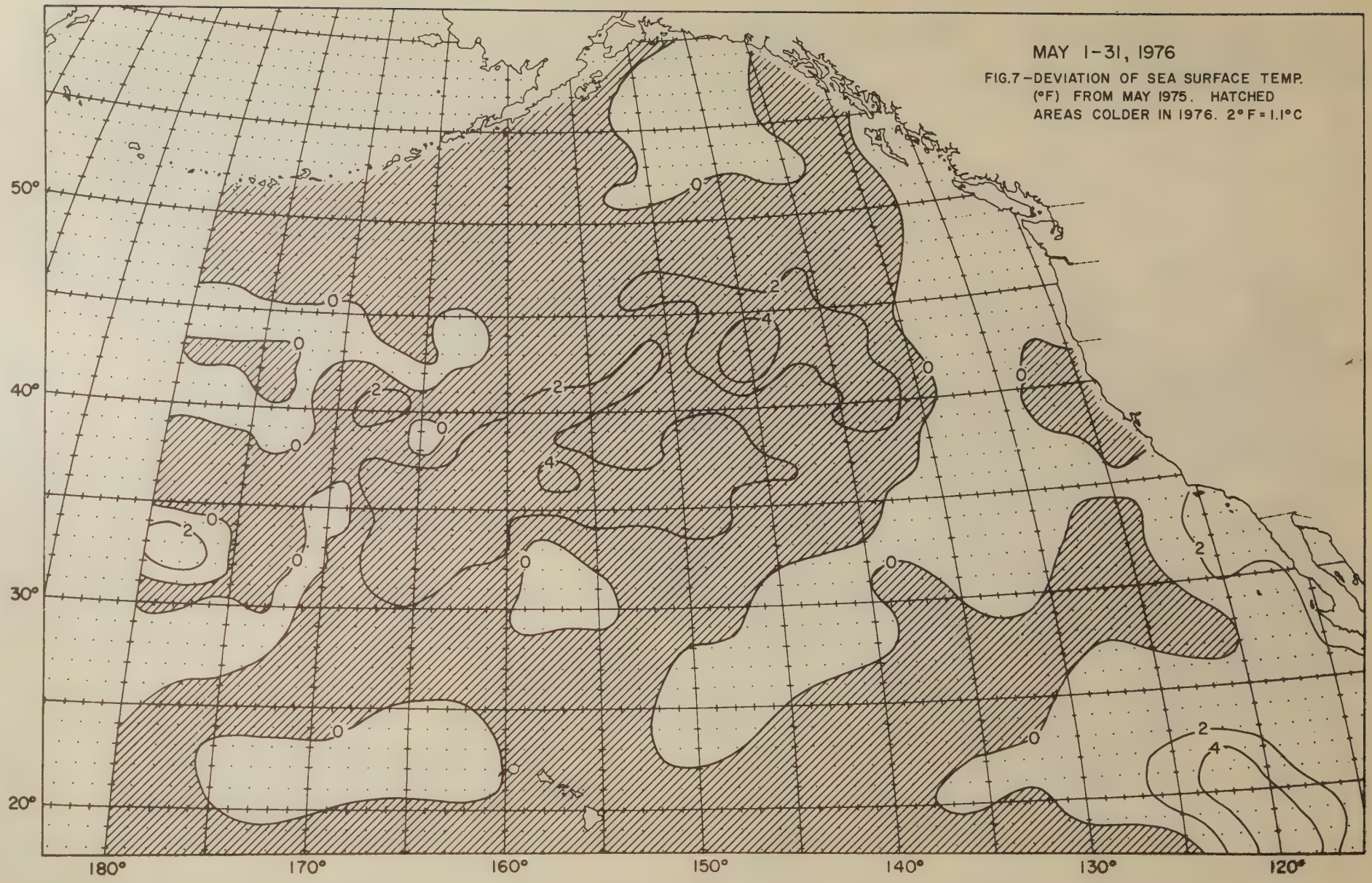

MAY 1976
FIG. 2—OBSERVED VALUES
-0000-BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1008
1012
1016
1020
1024
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

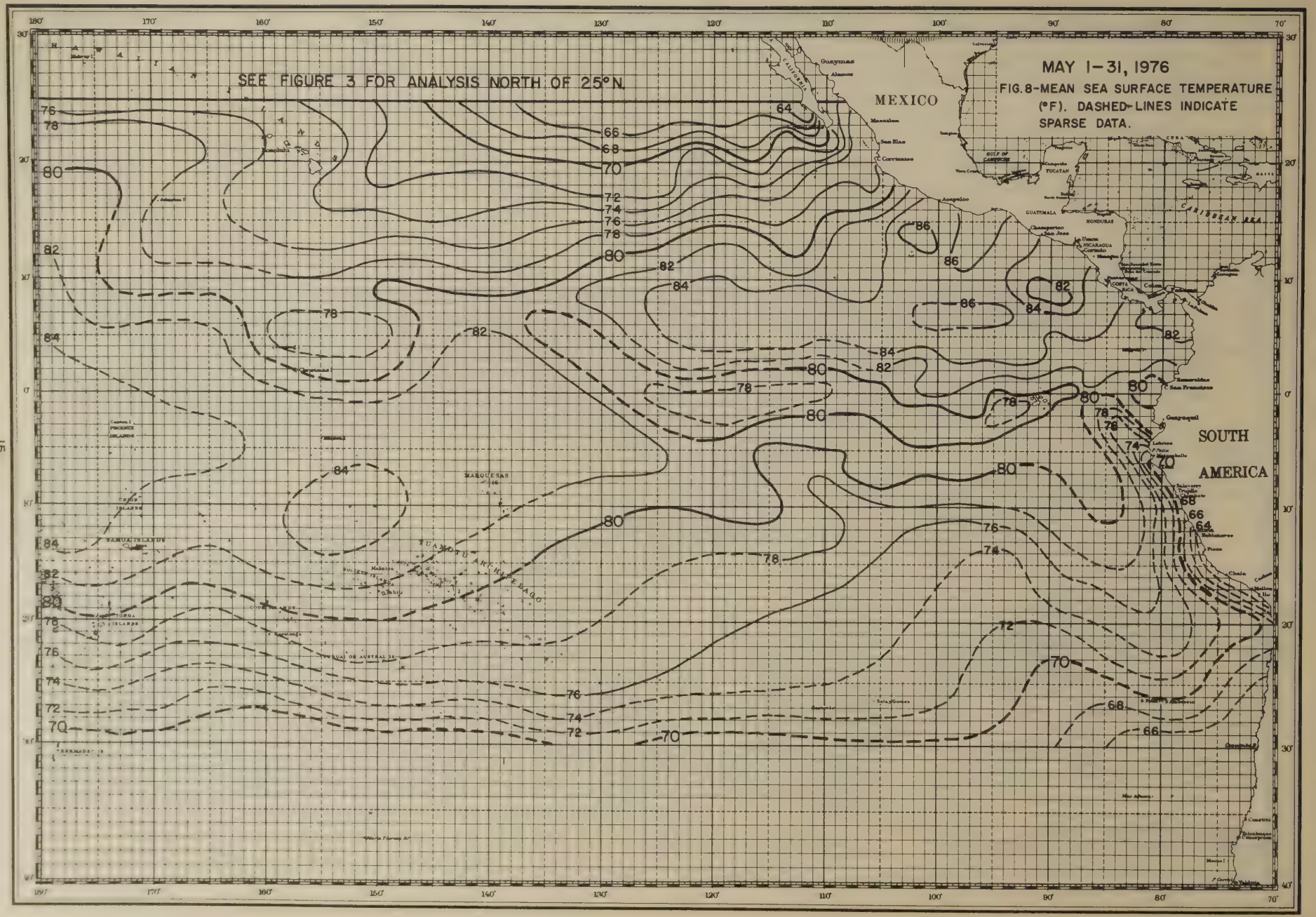

MAY 1-31, 1976
FIG.3-MEAN SEA SURFACE TEMPERATURE (°F)
No data
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MAY 1-31, 1976
FIG. 4—MEAN SEA SURFACE TEMPERATURE (°F.)
36
38
40
42
44
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
80
82
84
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


MAY 1-31, 1976
FIG. 5—DEVIATION OF SEA SURFACE TEMP. (°F.) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1975.
2°F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
2


MAY 1-31, 1976
FIG.6- DEVIATION OF SEA SURFACE TEMP. (°F.)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1976.
2°F = 1.1°C
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


MAY 1-31, 1976
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°F) FROM MAY 1975. HATCHED AREAS COLDER IN 1976. 2°F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


SEE FIGURE 3 FOR ANALYSIS NORTH OF 25°N.
MAY 1-31, 1976
FIG.8-MEAN SEA SURFACE TEMPERATURE (°F). DASHED-LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
TUAMOTU ARCHIPELAGO
MARQUESAS
PHOENIX ISLANDS
CANTON I.
ENDERBURY I.
SAMOA ISLANDS
TONGA ISLANDS
COOK ISLANDS
TUVALU OR AUSTRAL IS.
BERMUDA IS.
Guaymas
Alamos
Mazatlan
San Blas
Corrientes
Acapulco
Chiapa
Tapachula
San Jose
Corinto
Panama
Guayaquil
Salaverry
Trujillo
Chimbote
Callao
Pisco
Chala
Matarani
Ilo
Arica
Iquique
Tocopilla
Antofagasta
Caldera
Coquimbo
Valparaiso
San Antonio
Concepcion
Corral
Valdivia
Puerto Montt
Chonos Archipelago
Taitao Pen.
Evangelistas
Wellington
Juan Fernandez Is.
Easter I.
Sala y Gomez
Malden I.
Christmas I.
Fanning I.
Palmyra I.
Jarvis I.
Howland I.
Baker I.
Line Islands
Gilbert Islands
Ellice Islands
Fiji Islands
Rotuma I.
Nauru I.
Ocean I.
Guam
Marcus I.
Wake I.
Midway Is.
Hawaiian Is.
Johnston I.
Kingman Reef
Palmyra I.
Christmas I.
Fanning I.
Canton I.
Enderbury I.
Phoenix Islands
Samoa Islands
Tonga Islands
Cook Islands
Tuvalu or Austral Is.
Tuamotu Archipelago
Marquesas
Easter I.
Juan Fernandez Is.
Valparaiso
Concepcion
Valdivia
Puerto Montt
Chonos Archipelago
Taitao Pen.
Evangelistas
Wellington
Bermuda Is.
Caracas
Maracaibo
Puerto Cabello
La Guaira
Barquisimeto
Coro
Maracay
Valencia
Barcelona
Cumana
Maturin
Ciudad Bolivar
Puerto La Cruz
Carupano
Guiria
Trinidad
Tobago
Barbados
Grenada
St. Vincent
St. Lucia
Martinique
Dominica
Guadeloupe
Montserrat
Antigua
St. Kitts
Nevis
St. Croix
St. Thomas
St. John
Puerto Rico
Mona I.
Vieques I.
Culebra I.
Aruba
Curacao
Bonaire
Los Roques
Las Aves
Los Testigos
Margarita I.
Tortuga I.
Blanquilla I.
Orchila I.
Los Frailes
Los Monjes
Aves I.
Sombrero I.
Anguilla
St. Martin
St. Barthelemy
Saba
St. Eustatius
Virgin Is.
Tortola
Virgin Gorda
Anegada
Jost Van Dieman
Saba Bank
Navassa I.
Jamaica
Cuba
Haiti
Dominican Republic
Cayman Is.
Swan Is.
Serranilla Bank
Serrana Bank
Quitasueno Bank
Roncador Bank
Alijos Rocks
Clipperton I.
Socorro I.
Revillagigedo Is.
Guadalupe I.
Cedros I.
Natividad I.
San Benito Is.
Isla Cedros
Isla Natividad
Isla San Benito
Isla Guadalupe
Isla Clarion
Isla Socorro
Isla Revillagigedo
Isla Alijos
Isla Clipperton
Isla Malpelo
Isla Gorgona
Isla Gallo
Isla Malpelo
Isla Gorgona
Isla Gallo
Isla Malpelo
Isla Gorgona
Isla Gallo

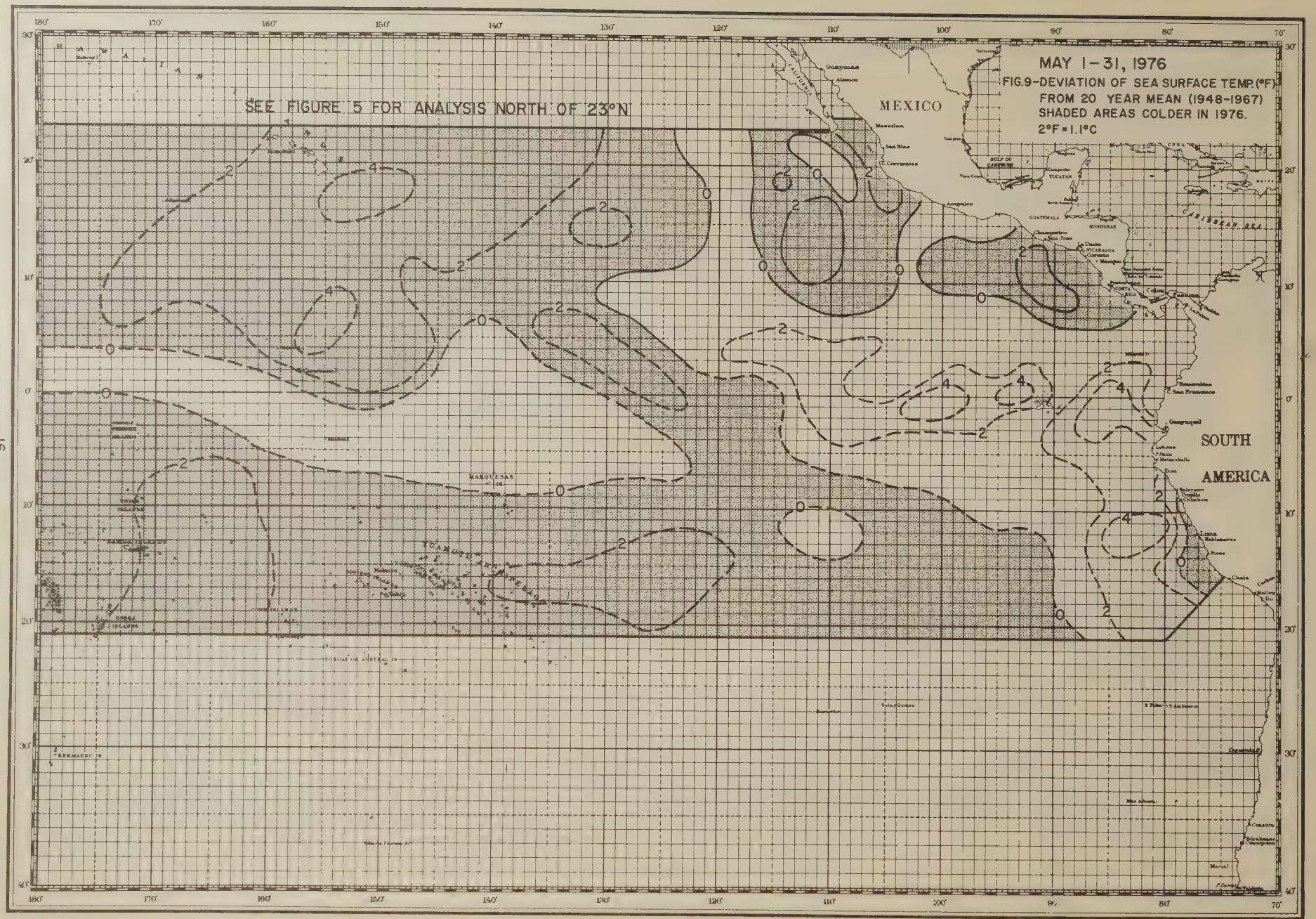

MAY 1-31, 1976
FIG.9-DEVIATION OF SEA SURFACE TEMP.(°F)
FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1976.
2°F = 1.1°C
SEE FIGURE 5 FOR ANALYSIS NORTH OF 23°N
MEXICO
SOUTH
AMERICA
HAWAIIAN
MARQUESAS
TUAMOTU ARCHIPELAGO
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
CUBA
YUCATAN
Acapulco
Manzanillo
San Blas
Corrientes
Guaymas
Almanco
Champerico
Puerto Limon
Cristobal
Colon
Esmeraldas
San Francisco
Guayaquil
Salaverry
Trujillo
Chimbote
Lima
Callao
Pisco
Chala
Mollendo
Arica
Iquique
Antofagasta
Coquimbo
Valparaiso
Talcahuano
Corral
Puerto Montt
Juan Fernandez Is.
Easter Is.
Sala y Gomez
Desventuradas Is.
Galapagos Is.
Cocos Is.
Clipperton I.
Revillagigedo Is.
Socorro
Tres Marias Is.
Tres Marias
Tres Marias Is.
Tres Marias
Tres Marias Is.
Tres Marias

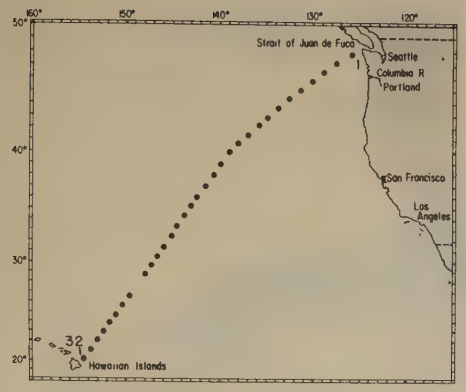
FIGURE 10

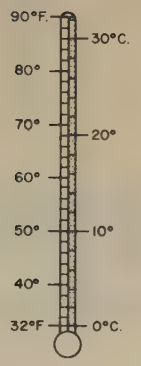
HILO — SEATTLE

MAY 6–11, 1976

CALIFORNIAN

VOYAGE 270





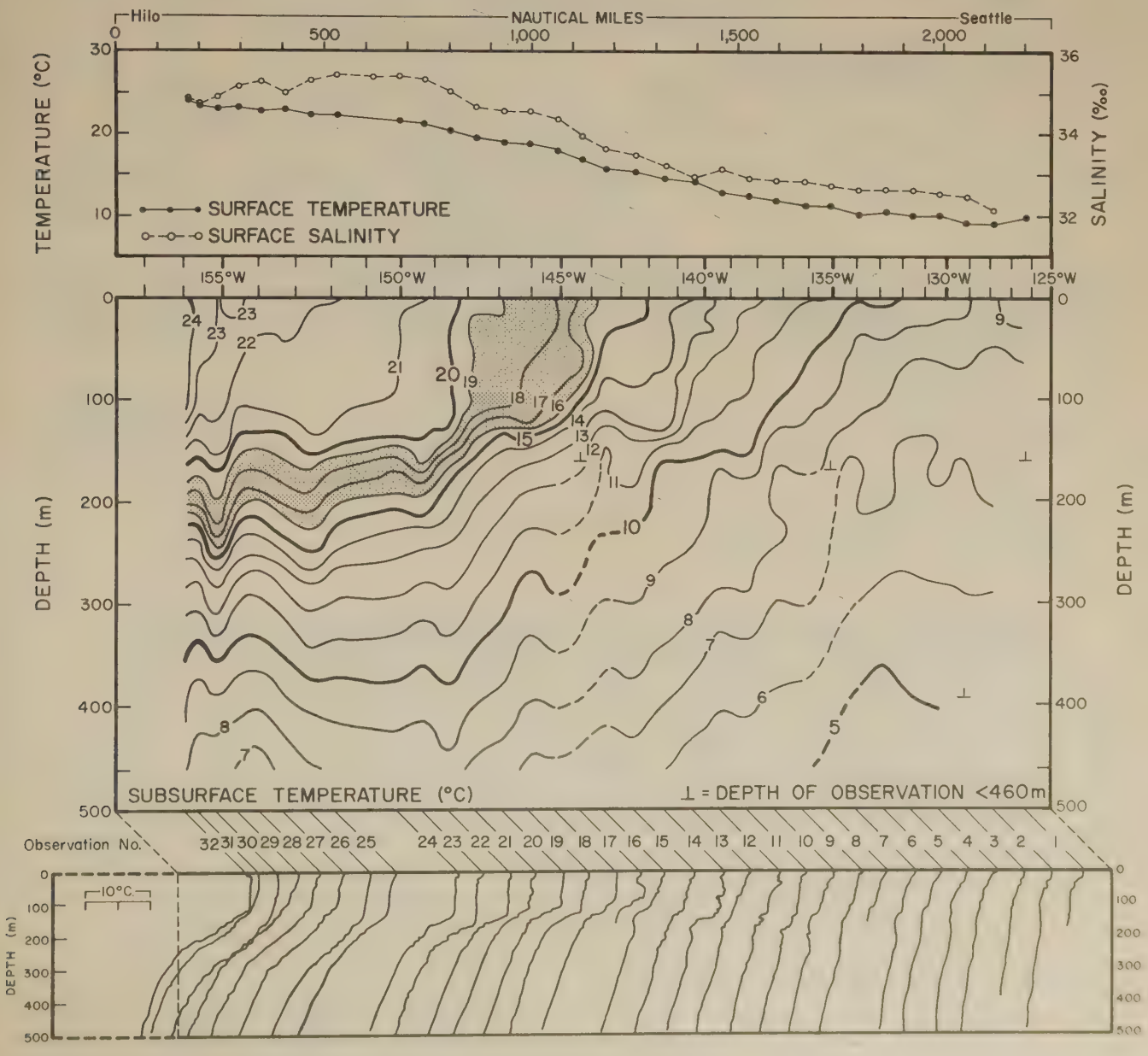
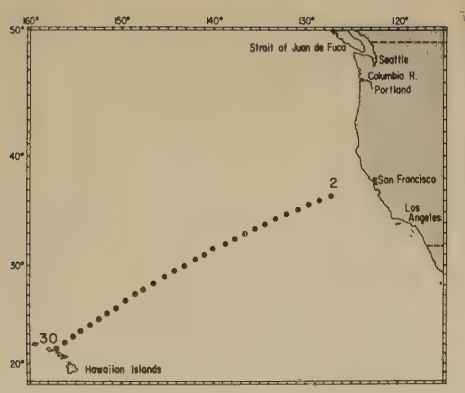
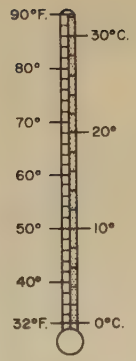


FIGURE 11



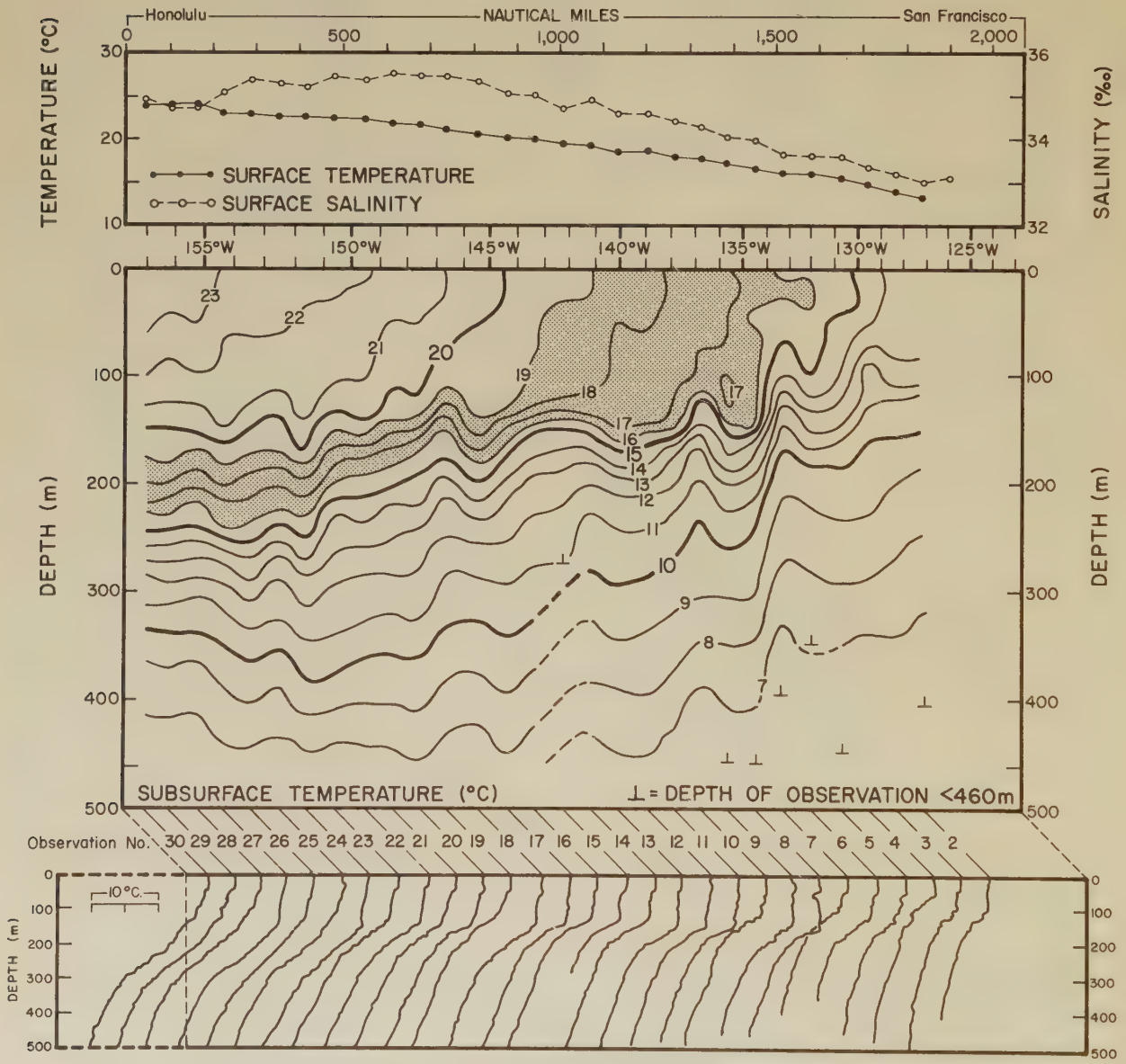


HONOLULU – SAN FRANCISCO

·MAY 13-18, 1976

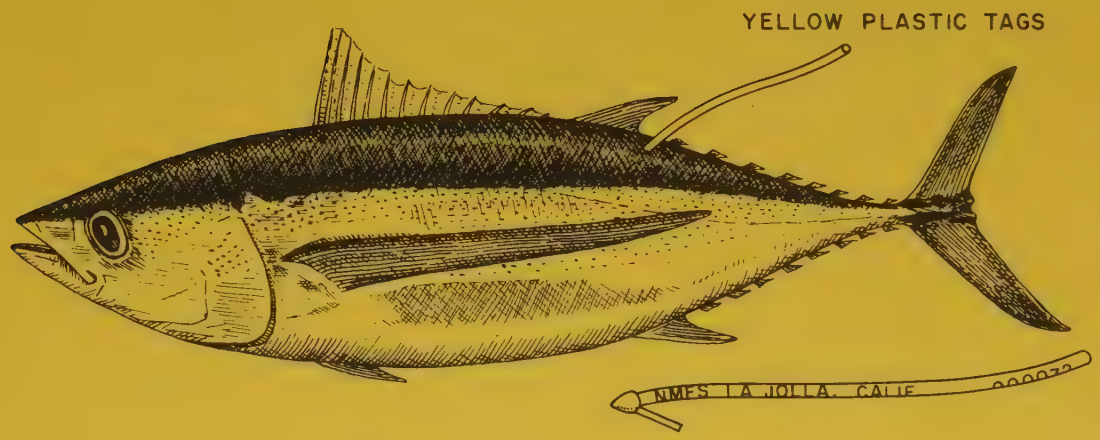
·HAWAIIAN QUEEN

VOYAGE 181



$ REWARD $

FOR ALBACORE TUNA TAGS



THE
NATIONAL MARINE FISHERIES SERVICE WILL PAY $ 2.00 FOR EACH TAG RETURNED.

THE
AMERICAN FISHERMEN'S RESEARCH FOUNDATION WILL AWARD CASH PRIZES FOR THE NUMBERS DRAWN IN AN ANNUAL LOTTERY.

WRITE:

- WHERE
- WHEN
- HOW

} *FISH WAS CAUGHT*

- LENGTH OF FISH (TIP OF LOWER JAW TO FORK OF TAIL)

FORWARD TO NMFS ADDRESS ON TAG OR TO AFRF
5055 N. HARBOR DRIVE, SAN DIEGO, CALIFORNIA

Daily broadcasts of albacore fishing information prepared by NOAA's National Marine Fisheries Service will be transmitted over marine radiobands starting July 9 and extending to October 31 or until the season ends. The broadcasts will be made on weekdays and Saturday mornings by the following radio stations:

WWD (La Jolla, California) on SSB carrier frequencies 4409.4, 8789.6, and 12424.5 kHz at 0615 and 1745 PDT on weekdays and 0715 on Saturdays.

KFX (Astoria Marine Operator) on 2598 kHz at 0630 and 1945 PDT.

KNPT (Newport, Oregon) on commercial AM 1310 kHz at 0615 and 1915 PDT.

NMC (Point Reyes Coast Guard) on AM compatible frequency 2670 and on SSB carrier frequency 8760.8 at 0645 and 1945 PDT.

KRED (Eureka, California) on commercial AM 1480 kHz 0600 and 2000 PDT.

(to determine the upper sideband assigned frequencies for tunable receivers add 1.4 kHz to WWD and NMC carrier frequencies)

UNITED STATES
DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
8604 LA JOLLA SHORES DRIVE
P.O. BOX 271
LA JOLLA, CALIFORNIA 92038

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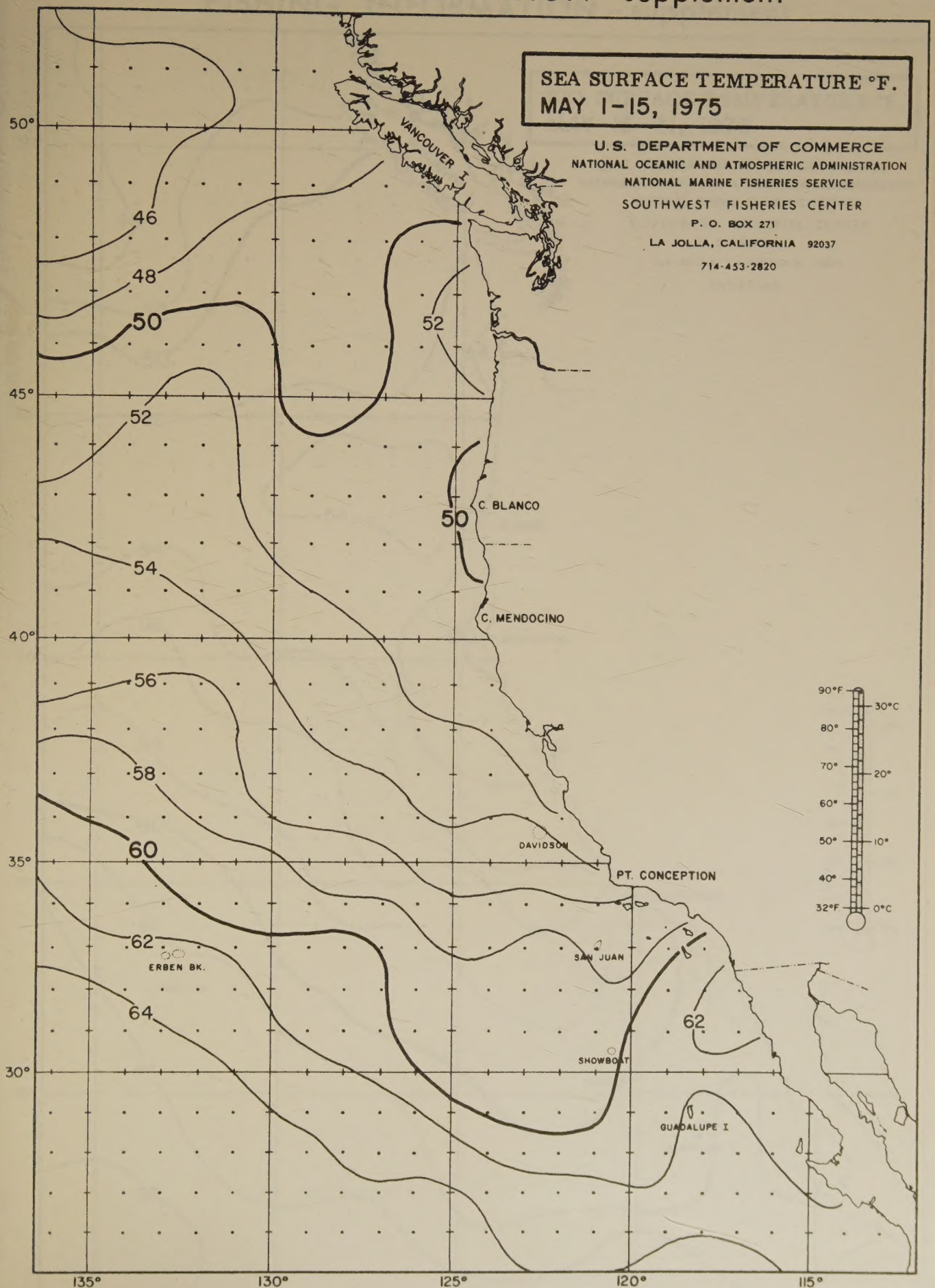
FISHING INFORMATION – supplement



FISHING INFORMATION – supplement